Solutions & Solubility

What is a solution?

Provide examples of solutions

What does it mean when we say something is soluble?

What do the terms - saturated, unsaturated and supersaturated mean?

Nov 18-9:11 AM

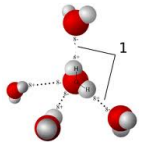
Factors Affecting Solubility

The formation of solutions depends on the relative strength of the following:

- forces that attract particles of the solute to each other
- forces that attract particles of the solute to particles of the solvent
- forces that attract particles of the solvent to each other

When a solution forms, all of the intermolecular forces between particles of the solute are broken (as well as some of the IMFs between particles of the solvent). Energy is required to release the ions and molecules from the crystal lattices in which they are present

Water is called the universal solvent....why?



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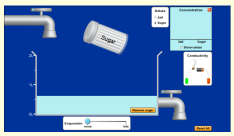
Explain why salt dissolves in water



Explain why sugar dissolves in water

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Factors Affecting Whether an Ionic Compound Is Soluble in Water

What factors determine whether a compound will be soluble in water?

- The amount of charge on each ion
- The size of each ion

IONIC CHARGE

The greater the charge on each ion the less soluble the compound will be e.g.

Formula	Charge	Solubility at 25C (g/100mL)
MgO	O^{2-}	
MgF_2	F^-	

ION SIZE

As ion size increases, so does solubility. Compounds with larger ions are usually more soluble than compounds with smaller ions. The radii of ions increases and therefore, the force of attraction between the ions decreases....so they can be separated more easily

POLARITY

"Like Dissolves Like" - Polar solvents can dissolve polar solutes. Sugar $C_{12}H_{22}O_{11}$ is not an ionic compound but it is polar (due to the presence of OH bonds). Therefore, it is dissolved by a polar solvent e.g. water

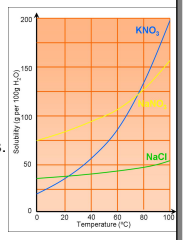
The most common types of non-polar solvents are hydrocarbons e.g. petrol and turpentine. They can dissolve non-polar solutes like grease, wax

Nov 22-10:55

How do we compare the solubility of different solids in liquids?

Solubility Curve Graphs:

- A pictorial representation of the data
- the ability of a solute to dissolve in water
- A solubility curve is a plot of solubility versus temperature.
- The line represents a saturated solution.
- Points below the line represent unsaturated solutions.
- Points above the line represent a supersaturated solution.



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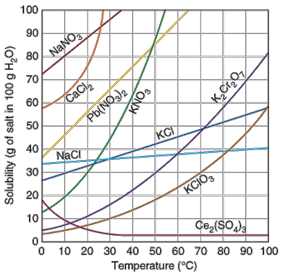
Solubility Curves for Ionic Compounds



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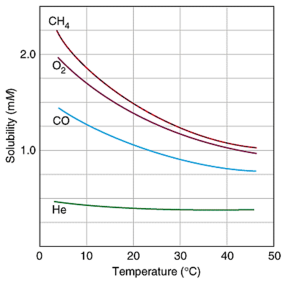
Solubility Curves for Gases



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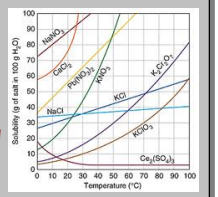
Factors Affecting Rates of Dissolving

1) Temperature

Solid solute and liquid solvent

In your supergroups, come up with reasoning for how temperature affects the rate of dissolving in this case
(Hint think of examples)



A graph that shows the relationship between solubility of a solute and temp is called a *solubility curve*

Gas in a liquid

Molecules in a _____ state have _____ kinetic energy than the same molecules in a solvent. Increasing the temperature of a solution provides energy for the _____ molecules to escape. So, the solubility of most gases in most liquid solvents _____ with an increase in temp

Liquid in a liquid

The solubility does not usually change with an increase in temperature

Nov 22-11:36

2) **Pressure**

Pressure has little effect on the solubility of a liquid or a solid, but it has a significant effect on the solubility of gases

The solubility of gas in a liquid is directly proportional to the pressure of that particular gas above the liquid

3) Surface Area

4) Agitation or Mixing

Nov 25-22:18

Research environmental effects of increased temperatures on solids/liquids or gases/liquids and provide a brief summary of one (in your words)

Full page
Hand it in tomorrow

Nov 26-08:57